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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
KURR, JASON RICHARD	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/522,857	LECHNER, THOMAS	
	Examiner	Art Unit	
	JASON R. KURR	2614	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 January 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 January 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1/31/05*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-11, 13-23 and 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Walton et al (US 5,285,502) in view of Tanaka (US 4,490,585).

With respect to claim 1, Walton discloses a control circuit (fig.1) for a signal strength information dependent frequency response adaptation of an audio signal for an electrodynamic transducer (fig.1 #40), the circuit comprising: a signal strength information determination means (fig.1 #14) for determining a signal strength information according to a level of the audio signal (col.4 ln.24-31), and a frequency modifying means (fig.1 #20) for selectively modifying the audio signal in response to the signal strength information such that the electrodynamic transducer converts the audio signal into a low distortion sound signal for high levels of the audio signal and has a flat frequency response for low levels of the audio signal (col.4 ln.47-59, col.5 ln.6-13), wherein a lower frequency range of the audio signal is modified with a gain that is different than a gain of a higher frequency range of the audio signal (col.4 ln.32-46,60-68).

Walton does not disclose expressly wherein the cutoff frequency of the frequency modifying means is shiftable.

Tanaka discloses a frequency modifying means that comprises a cutoff frequency for separating the lower frequency range from the higher frequency range is shifted towards higher values for an increasing level of the audio signal and towards lower values for a decreasing level of the audio signal (col.2 ln.24-34). At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the cut-off frequency shifting of Tanaka in the frequency modifying means of Walton. The motivation for doing so would have been to appropriately adjust the audio signal with respect to detected levels of low frequency noise signals as to improve speech intelligibility in noisy environments.

With respect to claim 2, Walton discloses a control circuit according to claim 1, wherein the modifying means comprises a high-pass filter (fig.1 #20), the cut-off frequency of which is shifted towards higher frequencies for increasing levels of the audio signal and is shifted towards lower frequencies for decreasing levels of the audio signal (Tanaka: col.2 ln.24-34).

With respect to claim 3, Walton discloses a control circuit according to claim 1, wherein the level of the audio signal is determined by a volume setting (col.4 ln.24-31). It is implied that hearing devices, such as the device supplied by Walton, comprise volume settings/adjustment that would affect the signal level detected by the detector #14.

With respect to claim 4, Walton discloses a control circuit according to claim 1, wherein the level of the audio signal is determined from a current amplitude or from a current energy content of the audio signal with respect to a full frequency range of the audio signal (col.4 ln.24-31).

With respect to claim 5, Walton discloses a control circuit according to claim 1, wherein the level of the audio signal is determined from a current amplitude or from a current energy content of a lower frequency range of the audio signal (fig.1 #12,14, col.4 ln.12-31).

With respect to claim 6, Walton discloses a control circuit according to claim 2, wherein the cut-off frequency of the high pass filter is shifted proportional to a square root of a peak amplitude of the audio signal (Tanaka: col.2 ln.6-23).

With respect to claim 7, Walton discloses a control circuit according to claim 2, wherein the cut-off frequency of the high pass filter is shifted proportional to a square root of a root mean square value of a frequency of the audio signal (Tanaka: col.2 ln.6-23).

With respect to claim 8, Walton discloses a control circuit according to claim 1, wherein the modifying means comprises a frequency range selective gain control for decreasing the gain of the higher frequency range of the audio signal corresponding to a decrease in a volume setting of the audio signal. It is implied that hearing devices, such as the device supplied by Walton, comprise volume settings/adjustment that would affect the signal level detected by the detector #14, thus if the volume is decreased then

the detector would see a decreased signal level resulting in a decrease in gain of the higher frequency range (col.5 ln.6-13).

With respect to claim 9, Walton discloses a control circuit according to claim 1, wherein the modifying means comprises a frequency range selective gain control (fig.6 #34, col.7 ln.55-57) for decreasing the gain of the lower frequency range of the audio signal corresponding to an increase in the level of the audio signal (col.8 ln.5-18).

With respect to claim 10, Walton discloses a control circuit according to claim 8, wherein the gain of the modifying means in the lower frequency range of the audio signal is independent of a volume setting of the audio signal (col.4 ln.32-46). The gain of the modifying means does not directly depend on the a volume setting of the device.

With respect to claim 11, Walton discloses a control circuit according to claim 10, wherein the gain of the modifying means in the lower frequency range of the audio signal has a constant value or decreases for a decreasing level of the audio signal, the gain in the lower frequency range being higher than the gain for the higher frequency range of the audio signal (col.4 ln.63-68).

With respect to claim 13, Walton discloses a control circuit according to claim 1, wherein a cut-off steepness of a filter and/or of a frequency range progresses approximately with the square of the frequency (Tanaka: col.2 ln.6-23).

With respect to claim 14, Walton discloses a method for a signal strength information dependent frequency response adaptation of an audio signal for an electro-dynamic transducer (fig.1 #40), the method comprising: determining a signal strength information according to a level of the audio signal (col.4 ln.24-31), and selectively

modifying a frequency of the audio signal in response to the signal strength information such that the electro-dynamic transducer converts the audio signal into a low distortion sound signal for high levels of the audio signal and has a flat frequency response for low levels of the audio signal (col.4 ln.47-59, col.5 ln.6-13), wherein a lower frequency range of the audio signal is modified with a gain that is different than a gain of a higher frequency range of the audio signal (col.4 ln.32-46,60-68).

Walton does not disclose expressly wherein the cutoff frequency of the frequency modifying means is shiftable.

Tanaka discloses a frequency modifying means that comprises a cutoff frequency for separating the lower frequency range from the higher frequency range is shifted towards higher values for an increasing level of the audio signal and towards lower values for a decreasing level of the audio signal (col.2 ln.24-34). At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the cut-off frequency shifting of Tanaka in the frequency modifying means of Walton. The motivation for doing so would have been to appropriately adjust the audio signal with respect to detected levels of low frequency noise signals as to improve speech intelligibility in noisy environments.

With respect to claim 15, Walton discloses a method according to claim 14, comprising determining the level of the audio signal based on a volume setting (col.4 ln.24-31). It is implied that hearing devices, such as the device supplied by Walton, comprise volume settings/adjustment that would affect the signal level detected by the detector #14.

With respect to claim 16, Walton discloses a method according to claim 14, comprising determining the level of the audio signal from a current amplitude or from a current energy content of the audio signal with respect to a full frequency range of the audio signal (col.4 ln.24-31).

With respect to claim 17, Walton discloses a method according to claim 14, comprising determining the level of the audio signal from a current amplitude or from a current energy content of a lower frequency range of the audio signal (col.4 ln.12-31).

With respect to claim 18, Walton discloses a method according to claim 14, comprising shifting the cut-off frequency separating the lower frequency range from the higher frequency range proportional to a square root of a peak amplitude of the audio signal (Tanaka: col.2 ln.6-23).

With respect to claim 19, Walton discloses a method according to claim 14, comprising shifting the cut-off frequency separating the lower frequency range from the higher frequency range proportional to a square root of a root mean square value of a frequency of the audio signal (Tanaka: col.2 ln.6-23).

With respect to claim 20, Walton discloses a method according to claim 14, comprising decreasing the gain of the higher frequency range of the audio signal corresponding to a decrease in a volume setting of the audio signal (col.5 ln.6-13).

With respect to claim 21, Walton discloses a method according to claim 14, comprising decreasing the gain of the lower frequency range of the audio signal corresponding to an increase in the level of the audio signal (col.8 ln.5-18).

With respect to claim 22, Walton discloses a method according to claim 20, wherein the method comprises a step for controlling the gain in the lower frequency range of the audio signal independent of the volume setting (col.4 ln.47-59).

With respect to claim 23, Walton discloses a method according to claim 22, wherein the method comprises a step for adjusting the gain in the lower frequency range of the audio signal at a constant value or by decreasing the value of the gain for an increasing level of the audio signal, whereby the gain of the lower frequency range of the audio signal is adjusted to a higher value than that for the higher frequency range of the respective audio signal (col.4 ln.47-59).

With respect to claim 25, Walton discloses a method according to claim 14, comprising controlling a transition in the gain from the lower frequency range to the higher frequency range such that a steepness of the transition is set approximately proportional to a square of the frequency (Tanaka: col.2 ln.6-23).

With respect to claim 26, Walton discloses a product for use on an audio system (col.3 ln.55-59), the product comprising: a device configured to determine a signal strength information according to a level of the audio signal (fig.1 #14, col.4 ln.24-31), and a device configured to selectively modify a frequency of the audio signal in response to the signal strength information such that the electro-dynamic transducer converts the audio signal into a low distortion sound signal for high levels of the audio signal and has a flat frequency response for low levels of the audio signal (fig.1 #20, col.4 ln.47-59, col.5 ln.6-13), wherein a lower frequency range of the audio signal is

modified with a gain that is different than a gain of a higher frequency range of the audio signal (col.4 ln.32-46,60-68).

Walton does not disclose expressly wherein the cutoff frequency of the frequency modifying means is shiftable.

Tanaka discloses a frequency modifying means that comprises a cutoff frequency for separating the lower frequency range from the higher frequency range is shifted towards higher values for an increasing level of the audio signal and towards lower values for a decreasing level of the audio signal (col.2 ln.24-34). At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the cut-off frequency shifting of Tanaka in the frequency modifying means of Walton. The motivation for doing so would have been to appropriately adjust the audio signal with respect to detected levels of low frequency noise signals as to improve speech intelligibility in noisy environments.

Walton does not disclose expressly wherein the product is realized by a computer program. Official Notice is taken that it is well known in the art that audio signal processing circuits can be realized by computer programs executable by signal processors. At the time of the invention it would have been obvious to a person of ordinary skill in the art to implement the processing of Walton through a computer program. The motivation for doing so would have been to provide a versatile system that is capable of storage of alternative audio signal processing programs such as a noise or echo cancellation program.

With respect to claim 27, Walton discloses a mobile telecommunication terminal (col.3 ln.55-59) comprising a control circuit for a signal strength information dependent frequency response adaptation of an audio signal for an electrodynamic transducer (fig.1 #40), the control circuit of the mobile telecommunications terminal comprising: a signal strength information determination means (fig.1 #14) for determining a signal strength information according to a level of the audio signal (col.4 ln.24-31), and a frequency modifying means (fig.1 #20) for selectively modifying the audio signal in response to the signal strength information such that the electrodynamic transducer converts the audio signal into a low distortion sound signal for high levels of the audio signal and has a flat frequency response for low levels of the audio signal (col.4 ln.47-59, col.5 ln.6-13), wherein a lower frequency range of the audio signal is modified with a gain that is different than a gain of a higher frequency range of the audio signal (col.4 ln.32-46,60-68).

Walton does not disclose expressly wherein the cutoff frequency of the frequency modifying means is shiftable.

Tanaka discloses a frequency modifying means that comprises a cutoff frequency for separating the lower frequency range from the higher frequency range is shifted towards higher values for an increasing level of the audio signal and towards lower values for a decreasing level of the audio signal (col.2 ln.24-34). At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the cut-off frequency shifting of Tanaka in the frequency modifying means of Walton. The motivation for doing so would have been to appropriately adjust the audio signal

with respect to detected levels of low frequency noise signals as to improve speech intelligibility in noisy environments.

Claims 12 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Walton et al (US 5,285,502) in view of Tanaka (US 4,490,585) as applied to claims 1 and 14 above, and further in view of Boast (US 4,109,107).

With respect to claim 12, Walton discloses a control circuit according to claim 1, however does not disclose expressly wherein the level of the audio signal is determined according to electro-mechanical properties of the electrodynamic transducer.

Boast discloses a circuit (fig.3,6 #42) for compensating for the electro-mechanical properties of a electrodynamic transducer (col.5 ln.56-68, col.6 ln.1-8). At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the circuit of Boast in the signal path of Walton. The motivation for doing so would have been to compensate for the dissipation of the transducer (including both friction and acoustical radiation).

With respect to claim 24, Walton discloses a method according to one of the claim 14, however does not disclose expressly wherein the method comprises a step for weighting the level and the frequency distribution of the audio signal according to the electro-mechanical properties of the electro-dynamic transducer.

Boast discloses a circuit (fig.3,6 #42) for compensating for the electro-mechanical properties of a electrodynamic transducer (col.5 ln.56-68, col.6 ln.1-8). At the time of the invention it would have been obvious to a person of ordinary skill in the

art to use the circuit of Boast in the signal path of Walton. The motivation for doing so would have been to compensate for the dissipation of the transducer (including both friction and acoustical radiation).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kinoshita et al (US 4,736,426) discloses a graphic balancer.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JASON R. KURR whose telephone number is (571)272-0552. The examiner can normally be reached on M-F 10:00am to 6:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on (571) 273-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jason R Kurr/
Examiner, Art Unit 2614

/Xu Mei/
Primary Examiner, Art Unit 2614